

CLAIMS

1. A yarn comprising an inner portion of spun staple fibers of recycled plastic and an outer portion comprising a different material.
2. The yarn of claim 1 wherein the plastic comprises post consumer recycled (PCR) polyethylene terephthalate (PET)
3. The yarn of claim 2 wherein the PCR-PET is formed from a pre-extruded liquid polymer insufficiently pure to pass through a twenty micron opening without clogging it.
4. The yarn of any of claims 1-3 wherein the plastic comprises at least about 30 percent by weight of the yarn.
5. The yarn of any of claims 1-4 where the outer portion comprises fibers selected from the group consisting of fire retardant fibers, moisture management fibers, bacterial resistant fibers, ultraviolet ray resistant fibers, low surface friction fibers, textured fibers, high tenacity nylon, aramid, and natural fibers.
6. The yarn of any of claims 1-5 further comprising a continuous filament core.
7. The yarn of claim 6 wherein the core comprises a high tenacity material having a tenacity greater than five grams per denier.
8. The yarn of claim 7 wherein the core has a tenacity between 8 and 35 grams per denier.
9. The yarn of claim 6 wherein the core has a texturized surface.
10. The yarn of claim 6 wherein the core is corespun, the core comprising at least one continuous filament and spun staples surrounding the filament.
11. The yarn of claim 6 wherein the core is a stretch material.
12. The yarn of any of claims 1-11 wherein the yarn is a fasciated yarn.
13. The yarn of any of claims 1-11 wherein the outer portion comprises spun staple fibers.

14. The yarn of any of claims 1-11 wherein the outer portion comprises a continuous helically wrapped cover yarn.
15. The yarn of claim 14 wherein the cover yarn comprises a continuous filament.
- 5 16. The yarn of claim 15 wherein the cover yarn is a monofilament.
17. The yarn of claim 15 or 16 wherein the outer portion comprises two helically wrapped cover yarns, wrapped in opposite directions.
- 10 18. The yarn of claim 15 wherein the cover yarn comprises a spun yarn.
19. The yarn of claim 5 wherein a fabric formed of the yarn has a tensile strength greater than that of a fabric formed of the core material of a denier equal to the denier of the yarn.
- 15 20. A yarn comprising an inner portion of spun staple fibers and an outer portion comprising an inner helix and an outer helix formed of a material different from the inner helix.
21. A yarn comprising two spun staple fibers of different material, the first staple fibers being longer than the second staple fibers, the second staple fibers forming a major part of the surface of the yarn.
- 20 22. A yarn comprising a core formed of at least one strand of a continuous filament having a tenacity of at least about five grams per denier, a sheath of staple fibers surrounding the core, and a cover comprising an inner helix and an outer helix.
- 25 23. The yarn of claim 22 wherein the sheath comprises PCR plastic.
24. The yarn of claim 23 wherein the PCR plastic is PET.
25. The yarn of any of claims 22-24 wherein the outer helix is formed of a material different from the inner helix.
- 30 26. A fabric woven or knitted of the yarn of any of claims 22-26.

27. The fabric of claim 26 wherein the fabric has a tensile strength greater than that of a fabric formed of the core material of a denier equal to the denier of the yarn.

28. A method of forming a yarn containing staple fibers of PCR plastic, comprising spinning a plastic-surfaced yarn from the staple fibers of PCR plastic, and thereafter forming a cover over the plastic surfaced yarn.

29. A yarn comprising a high strength fasciated yarn comprising two spun staple fibers of different materials, the first being synthetic and not moisture absorbent and longer than the second fibers, the second fibers being material containing properties designated by the requirements of a particular end use as the desired yarn surface and forming a major part of the yarn surface.

30. A method of producing a spun yarn comprising two layers of sheath over a continuous core, the method comprising simultaneously feeding two different staple fibers into a spinning device to simultaneously form the two layers over the core, one of the layers being predominantly one of the staple fibers, and the other layer being predominantly the other.

31. The method of claim 30 wherein the staple fibers are fed through a T-trumpet.

32. The method of claim 30 or 31 wherein one of the fibers is a PCR plastic and predominates in an inner layer over the core.

33. The method of claim 32 wherein the other fiber is selected from the group consisting of fire retardant fibers, moisture management fibers, bacterial resistant fibers, ultraviolet ray resistant fibers, low surface friction fibers, textured fibers, high tenacity nylon, aramid, and natural fibers.

34. The method of claim 33 wherein the other fiber is a natural fiber selected from the group consisting of cotton, wool, silk, rayon, and linen.

35. A method of producing a spun yarn comprising two layers of sheath over a continuous core, the method comprising forming an intermediate yarn by feeding a first staple fiber into a spinning device to form a sheath of the first staple fiber over the core, and thereafter feeding a second staple fiber into a spinning device to form a sheath of the second staple fiber over the intermediate yarn.

5 36. The method of claim 35 wherein the first staple fiber is a PCR plastic.

37. The method of claim 36 wherein the PCR plastic is PCR-
10 PET.

38. The method of any of claims 35-37 wherein the second fiber comprises a natural fiber.

39. The method of claim 33 wherein the second fiber is cotton.

40. A corespun yarn comprising a core and two sheaths over the
15 core, the first sheath being formed of spun staple fibers of different compositional makeup than the second sheath.

41. The yarn of claim 38 wherein the second sheath comprises a minor portion of the material of the first sheath in addition to at least one other material.

20 42. A method of producing a yarn comprising a core, a sheath, and a cover, the method comprising forming an intermediate yarn by feeding a first staple fiber into a spinning device to form a sheath of the first staple fiber over the core, and thereafter forming at least one helix of a continuous yarn around the intermediate yarn.

25 43. The method of claim 42 wherein the first staple fiber comprises PCR-PET.

44. The method of claim 41 or 42 comprising forming an inner helix and an outer helix around the intermediate yarn.

45. A continuous and multi-filament yarn having a total denier of
30 12-800 and comprising 10-90% by weight of continuous high tenacity and high modulus monofilaments having a tenacity higher than 15 and a

modulus higher than 500, intermingled with continuous lower tenacity and lower modulus monofilaments having a tenacity between 5 and 15.

46. A yarn comprising a core of the yarn of claim 45 and a sheath of spun staple fibers.

5 47. The yarn of claim 46 wherein the sheath comprises recycled plastic staple fibers, the yarn further comprising an outer spun covering.

48. A fabric comprising a ripstop grid of the yarn of claim 45.